

CLAIMS

1. A method of controlling the torque of a multiphase induction motor, the method consisting of energizing the stator windings of said motor from a controller type power converter using thyristors or the like, inserted between a multiphase main supply (V1, V2, V3) and said windings (S1, S2, S3), characterized in that it consists in:

- producing a stator current set point expressed by its amplitude ( $I_s^*$ ) and its phase ( $\alpha^*$ ) referred to the rotor flux as a function of independent parameters ( $C^*$ ,  $\Phi_r^*$ ) representative of the required torque and flux,

- predicting phase coincidences between said stator current and said set point, and

- commanding (8) said controller so that the windings receive current waves substantially when such coincidences occur.

2. A method according to claim 1, characterized in that said controller is commanded when the angle ( $\alpha$ ) between said stator current and the average position of the rotor flux during a corresponding wave is in a tolerance window defined by the condition:

$$\alpha^* - e < \alpha < \alpha^* + e$$

where  $e$  is a predetermined parameter and  $\alpha^*$  is said phase of said stator current set point.

3. A method according to claim 2, characterized in that said parameter ( $e$ ) is chosen to be large enough to command said controller (I1, I2, I3) at least once in each rotation cycle of the mains voltage around the rotor flux.

4. A method according to any of claims 1 to 3, characterized in that the rotation direction of the motor (M) is chosen to be the opposite of that which would apply in the event of direct application of the multiphase voltage of the mains supply (V1, V2, V3) via the

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continuously conducting switches of said voltage controller.

5. A method according to claim 1, characterized in that, for a multiphase mains supply with  $n$  phases,  $2n - 1$  bidirectional switches using thyristors are employed, connected and controlled to provide the two possible rotation directions (forward and reverse) of the multiphase mains voltage.

6. Method according to claim 1, characterized in that, for a multiphase mains supply with  $n$  phases, said controller includes  $n^2$  bidirectional switches employing thyristors, connected and controlled so that each phase of the motor can be connected to each phase of the mains supply and thereby provide, for the voltage applied to the motor, two groups each of  $n$  multiphase voltages, with a phase difference between them of  $360^\circ/n$  in the same group, each group turning in the direction opposite to the other.

7. A method according to claim 2, characterized in that the average position of the rotor flux during the duration of the current wave is considered as equivalent to its position at the time at which the current wave is at a maximum.

8. A method according to claim 7, characterized in that the amplitude of the current waves and the stator current set point ( $I_s^*$ ) are equalized by adjusting the time difference ( $\Delta t$ ) between application of the command to said controller, and consequently the start of the current wave, and the time ( $t_0$ ) at which said wave is at a maximum.

9. A method according to claim 1, characterized in that the rotor electromotive force is determined from measured stator voltages ( $e_1, e_2, e_3$ ) in the same time interval in which the controller is not conducting and in that the speed of said electromotive force is used to represent the estimated speed of the motor.

10. The method according to claim 9, characterized

in that two series of stator voltages ( $e_1$ ,  $e_2$ ,  $e_3$ ) are respectively measured immediately before and after conduction of said controller, in that a speed of said rotor electromotive force during conduction is deduced therefrom, and in that the torque is deduced from the difference between said speed of the rotor electromotive force and the estimated speed of the motor.

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